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Geobotanical features of alpine and subalpine vegetation of summer pastures in the East Zangazur economic region and its significance

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The article gives data on the geobotanical investigation of summer pastures in the Kalbajar and Lachin regions of the East Zangazur Economic Region, as well as phytocenological features of subalpine and alpine vegetation based on pre-occupation research. In the wake of the research, phytocenological features, the composition of species, structure, productivity and pasture capacity of alpine and subalpine vegetation of the region were determined. Scientific and practical recommendations were given for the effective utilization of the summer pastures of the liberated from occupation Kalbajar and Lachin districts of the Eastern Zangazur economic region and their improvement.

Keywords: *Phytocenosis, formation, association, dominant, pasture, productivity, pasture capacity, subdominant, endemic*

INTRODUCTION

The division of economic regions indicated in the State Program has a major significance for the purposes of implementation of the “State Program of socio-economic development of the regions of the Republic of Azerbaijan in 2019-2023” approved by the Decree of the President of the Republic of Azerbaijan No. 500 dated January 29, 2019. Therefore, one of the economic regions mentioned in the Decree of the President of the Republic of Azerbaijan dated July 7, 2021 "On the new division of economic regions in the Republic of Azerbaijan" is the East Zangazur economic region. This economic region includes Jabrayil, Kalbajar, Gubadli, Lachin and Zangilan districts (Decree of the President of the Republic of Azerbaijan, 2001; Map of Azerbaijan Republic (Zangazur county), 1918-1920).

Purposeful reforms and large-scale measures implemented in Azerbaijan have further strengthened the economic and military-defense power of our country and laid the groundwork for achieving a glorious victory in the 44-day Patriotic War.

From this point of view, at present, measures are being carried out for the restoration of the liberated territories, including summer pastures, ensuring their future development, creation of the necessary infrastructure and returning of the population to their native lands. In this regard, the research of geobotanical features of alpine and subalpine meadows spread in Kalbajar and Lachin regions in the efficient utilization of natural resources of the East Zangazur economic region, as well as summer pastures, where it allows economic assessment of subsoil pasture lands (Mammadov, 2003).

For this reason, the following research is planned to be carried out in the summer pastures of Kalbajar and Lachin regions, which are surrounded by the Zangazur mountain range and are located on the border with Armenia:

- characterization of the composition of species and structure of vegetation of alpine and subalpine meadow at the level of types, formations and associations;
- development of the classification of phytocenoses according to the principles of dominance;
- determination of pasture productivity, quality of forage and capacity;
- giving recommendations with scientific and practical substantiation for measures of the effective utilization and improvement of pastures.

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MATERIALS AND METHODS

Information on species composition, structure, productivity, forage quality and grazing of Narduseta, Poaeta-Carexetum belonging to alpine meadow, as well as Festuceta-Amoriaetum and Festuceta-Alchemilletum formations which are characteristic of subalpine vegetation is given. These formations which spread over the widest natural habitat in the summer pastures, which are considered to be a rich natural forage base (kept in state ownership) for livestock breeding, as well as nomadic sheep breeding in the highland areas of Kalbajar and Lachin regions that located in the north-western part of the Lesser Caucasus Mountains in the Kalbajar-Lachin economic-geographical region of the East Zangazur economic region (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005 (2005); Aghaguluyev, 2011; Hajiyev et al., 1995; Gurbanov et al., 2017; Prilipko, 1970).

During the research, the systematic taxa and natural habitat of plant species spread in alpine and subalpine vegetation in Kalbajar and Lachin area were clarified according to "Flora of Azerbaijan" (Flora of Azerbaijan, 1950-1961), as "Mountain vegetation of the Lesser Caucasus" (Gurbanov, 2017), the names of species also was given according to S.K.Cherepanov (Cherepanov**,** 1995), V.J.Hajiyev and T.E.Gasimova (Hajıyev et al., 2008). Besides this, references were made to the map of vegetation cover of summer pastures of both districts, including maps authored by Y.M.Isayev (1949), V.J.Hajiyev (2007) and G.S.Mammadov et al. (Vegetation map of Azerbaijan, 2007; Hajıyev et al., 1990).

Phytocenological or geobotanical features of the Lesser Caucasus Mountains located within the territory of the Republic of Azerbaijan have been studied for various purposes by L.I.Prilipko (Prilipko, 1970), V.J.Hajiyev (Hajıyev, 2004; Hajıyev et al., 1977; Gurbanov et al., 2017; Mammadov, 2003), E.M.Gurbanov (Gurbanov et al., 2017) and other botanists.

Indicators related to the classification, productivity, quality of forage and pasture capacity of the area of summer pastures located in the area of Karabakh volcanic plateau of Kalbajar and Lachin district were noted in accordance with the "General Scheme on the effective utilization of Natural Forage Areas of Azerbaijan until 2005" (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005 (2005)).

The total area of natural forage areas (summer pastures, rural pastures and hayfields) located in the territory of Kalbajar region was 77148.0 hectares (according to 1949 data) (Map of the types of natural forage lands of summer pastures of the State fond of nearvillage pastures and haymakings of Kalbajar region of Azerbaijan SSR, 1949). However, the summer pastures of this region are shown in the "General Scheme" at 74,840 hectares.

According to the land balance of the region, the total area of pastures located in Kalbajar administrative district is 93,354 hectares. The pastures in the territory of this district have been used for flocks of sheep or goats (ovine) in 17 administrative districts during the grazing season (summer season) before the Armenian occupation. Currently, more than 9-10 thousand sheep can be fed in the summer pastures of the Kalbajar region.

The climate of the highlands in the Kalbajar region is characterized by cold, harsh, dry and humid winters, and frequent fogging of pastures is typical (Hajıyev et al., 1977; Mammadov, 2003). Such conditions have a positive effect on the grazing of small horned cattle in summer pastures. Here, it is purposeful the grazing of the flocks of sheep in alpine and subalpine meadows during June 15 - October 15 due to the influence of climatic factors.

Here, alpine vegetation formed on the undeveloped fragile grassy mountain-meadow and dense grassy mountain-steppe soils of the alpine and subalpine zone is spread at 2600-3200 meters and above sea level but subalpine vegetation is spread at an altitude of 1800-2500 meters (Aghaguluyev, 2011; Gurbanov et al., 2017; Map of the types of natural forage lands of summer pastures of the State fond of nearvillage pastures and haymakings of Kalbajar region of Azerbaijan SSR, 1949).

The relief of the area is mainly high mountainous, as well as the economic-geographical region of Kalbajar-Lachin occupies the East Goycha in the north-west, Murovdagh in the north, and the Karabakh plateau in the east. The Mikhtoken range stretches in the central part. The highest tops are Gamish (3724 m), Dalidagh (3616 m), Gizilbogaz

(3562 m) And Boyuk Ishigli (3552 m), As well as the Omar Pass (3200 m).

Cretaceous, Paleogene, Neogene and Anthropogenic sediments located in this area are widespread. The main rivers are the Tartar (which flows into the Sarsang Reservoir) and the Lev River, the Tutgunchay and the Bazarchay which are its tributaries; There are small and large Alagol lakes and Zalkha lakes (Gurbanov et al., 2017). The headwater of Tartar River begins in the Lesser Caucasus from an altitude of 3120 meters and has 31 tributaries. Areas of summer pastures are rich in springs (Jeyran spring, Yuz spring, Kirkhbulag, Aygir spring, etc.). Herds of cattle grazing in the summer pastures are supplied with water through the water of these rivers and springs.

The alpine and subalpine meadows of the summer pastures of the Kalbajar district, located in the Eastern Zangazur economic region, are not fully developed, and are spread on peaty mountain meadow and dense grassy mountain meadow-steppe soils (Vegetation map of Azerbaijan, 2007; General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005; Gurbanov et al., 2017; Hajıyev et al., 1990). However, alpine carpets and tall grass meadows are found here in a small area. Alpine carpets are found in the form of spots on bare rocks, boulders and primitive soils at an altitude of 3200 m above sea level, especially in the high mountains of the area (Gurbanov et al., 2017). In this meaning, *Koeleriaeta albovi, Alchmilleta sericata, Narduseta stricta, Taraxacumeta Stevenii, Zernaeta variegata, Plantago lanceolata, Sibboldia parviflora* and others. species are considered major edificators to various herbaceous low statured alpine carpets (Aghaguluyev, 2011).

The territory of Lachin region is 1840 km^2. The relief is mostly highland. The southeastern slopes of the Karabakh plateau are located in the east of the region, and the Mikhtoken range is located in the north; It is calculated that the highest top is Gizilbogaz Mountain (3594 m). The main rivers of this region are Hakari, Shelva and Pirjanis. The Hakari River is formed at the confluence of the Shalva and Hochazsu rivers, which flow at an altitude of 950 m above sea level. It is calculated that the source of the Shelvachay is the Mikhtoken range (3411 m). Garagols in the territory of summer pastures and Alagols located on the border with Armenia are available. The total area of summer pastures located in the region is 70,156 ha (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005) and the usable pasture area is 53,334 hectares.

Garagol is located on the border of Lachin region of the Republic of Azerbaijan and Gorus region of Armenia (considered as Eastern Zangazur) (Map of Azerbaijan Republic (Zangazur county), 1918-1920). This lake is surrounded by the territory of the Karabakh reserve; Herds of sheep grazing in summer pastures and the pastures around this lake are provided with water from the lake.

Ishigli Garagol State Nature Reserve was established on October 17, 1987 by the decision of the directive bodies. The reserve is located in the southern part of the Karabakh volcanic plateau on the slope of Mount Ishigli (3552 m) at an altitude of 2650-2700 m (Aliyev et al., 1993). Here (in Lachin region) the cold climate type with dry winters prevails (Hajıyev et al., 1977); the average annual temperature is 5°C and the amount of annual precipitation is 700 mm.

The dry area of the reserve that surrounds the lake consists of typical alpine meadows of the highland belt. There are more than 100 species belonging to 27 families and 68 genera in the wild flora of this place (Aliyev et al., 1993).

RESULTS AND DISCUSSION

The most widespread alpine and subalpine vegetation in the summer pastures of the Kalbajar region (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005) includes the following associations:

1. *Narduseta stricta*; 2. *Poaeta badensis – Amorietum ambigum*; 3.*Festuceta ovina – Trifolietum ambigum*; 4. *Agrostiseta planifolia*; 5. *Zernaeta variegata*; 6. *Koeleriaeta albovi* (with thing stem) – *Alchmilleta sericata*; 7. *Phleumeta alpinum*; 8.*Taraxacumeta Stevenii – Poaetum pratense*.

The following formations and associations can be noted in alpine and subalpine vegetation happen to meet in a wide natural habitat in summer pastures located in the highland zone of the Lachin region:

1. Agrosieta tenuis – Koelerietum albovii; 2. *Trifolieta medium – Festucetum pratensi*s; 3. *Dactyliseta glomerata – Festucetum pratensis*; 4. *Festuceta ovina – Alchemilletum sericata*; 5. *Hordeumeta violaceum – Trifolietum pratense*; 6. *Poaeta badensis – Carexetum tristis*.

According to V.J.Hajiyev (Hajıyev, 2004), the floristic composition of summer pastures vegetation in the ecosystem of highland vegetation of Azerbaijan consists of 250 species. More than 350 types of fodder plants, 200 species of essential oil plants, 800 species of medicinal plants, more than 100 species which contain tannins, 300 species of melliferous plants etc. are spread in these pastures. In particular, according to the author's note, alpine and subalpine phytocenoses are represented in 9 formations (Gurbanov et al., 2017) in the mountainous belt of the Lesser Caucasus.

The study shows that subalpine and alpine meadows are spread at an altitude of 1800-2200-3000 m above sea level in the high mountain ranges of the Greater and Lesser Caucasus of Azerbaijan, in the high mountains of Talysh and Nakhchivan AR; Alpine meadow vegetation is found at an altitude of 2400-3200 m. The edificators of subalpine meadows were recorded with highgrass vegetation, in contrast the dominant and subdominants of alpine meadows were recorded with short stature plants (Gurbanov et al., 2017).

The phytocenological classification of alpine and subalpine vegetation in summer pastures (Vegetation map of Azerbaijan, 2007; Hajıyev, 2004; Gurbanov et al., 2017; Hajıyev, et al., 1990; Map of the types of natural forage lands of summer pastures of the State fond of nearvillage pastures and haymakings of Kalbajar region of Azerbaijan SSR, 1949) in the territory of Kalbajar and Lachin districts of East Zangazur economic region is given below:

I.Alpine vegetation type.

Grain grass *Hordeum brevisubulatum* formation class:

1. *Narduseta formation* group.

Narduseta stricta (matgrass) association/

Carex tristis formation class

Poaeta – Carexetum formation group.

Poaeta badensis – Carexetum tristis association.

II. Subalpine vegetation type.

Graingrass – legume grass formation class (*Fabaceae*) *Astragalus* captiosus

Festuceta - Amoriaetum formation group.

Festuceta pratensis – Amoriaetum ambigua association.

Vvarious herbs - *Hordeum brevisubulatum-Herbose*to) formation class

Festuceta – Alchemilletum formation group.

(*Festuceta ovina* (Sheep's fescue) – *Alchemilletum sericata* association.

Research shows that 21 species are found in the species composition of the *Narduseta stricta* (matgrass) association of the *Narduseta* formation, in the summer pastures of Kalbajar region (in the direction of the source of the Ayrim river and Goycha range) at an altitude of 2845 m above sea level, in the alpine vegetation.

2 species (9.5%) belong to shrubs, 1 species (4.8%) to semi-shrubs and 18 species (85.7%) to perennial grasses according to the life forms (Hajiyev et al., 1995; Gurbanov et al., 2017; Prilipko, 1970) or biomorphological analysis of the species composition of the association; 8 species (38.1%) represented by mesophytes, 2 species (9.5%) by mesoxerophytes and 11 species (52.4%) by xreophytes from the same amount of species according to the analysis of plants on ecological groupings.

The abundance of phytocenosis monodominant *Nardus stricta* L. (matgrass) is estimated at 4-5 points. The vegetation has 2 floors according to the structure or structure of the association. The total project coverage is 70-90%.

The names of the species of *Rosa tuschetica* Boiss., *Thymus grossheimii* Ronn., and *Delphinum speciosum* Bieb. which from the endemics (Gurbanov et al., 2017) of the Caucasian natural habitat mentioned in the species composition of the Narduseta formation are included in the "Red Book of Azerbaijan" (2003) (Red Book of the Republic of Azerbaijan, 2013). Therefore, based on the geobotanical characteristics of alpine vegetation in the area, it is recommended to implement measures for the efficient utilization of summer pastures in Kalbajar region (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005; Aghaguluyev, 2011; Hajıyev, 2004; Gurbanov et al., 2017).

29 species occur in species composition of association of Festuceta pratensis- Amoriaetum ambigua of the subalpine vegetation spread in the summer pastures of Kalbajar region, in the "Sususlug plateau" at an altitude of 2415 m above sea

level, in dense grassy mountain meadows - steppe-type soils.

4 species (13.8%) shrubs, 2 species (6.9%) shrubs and 23 species (79.3%) perennial grasses participate in the composition of species based on biomorphological analysis of land plants (embryophytes); 14 species (48.3%) are represented by mesophytes, 4 species (13.8%) by mesoxerophytes, 10 species (34.4%) by xerophytes and 1 species (3.5%) by hydrophytes from the same amount of species according to the ecological analysis.

İt is considered that the dominant of the formation is Amoria ambigua Bieb. Sojak., and its abundance is 3-4 points and subdominant is Festica pratensis Huds., its abundance is estimated by 2-3 points.Vegetation consists of a three-storey structure. The total project coverage is 60-80%.

The species of Thymus transcaucasica Ronn., and *Phleum pratense* L. are endemic plants of Caucasian natural habitat which occur in the species composition of vegetation (Yaroshenko, 1961). Therefore, it is expedient to protect the relevant plants during the improvement of summer pastures of the Kalbajar region.

Research has shown that natural phytocenoses spreading in summer pastures of the Lachin region, located in the mountainous area of the Lesser Caucasus, including indicators on subalpine meadows have higher species composition, abundance, as well as formation productivity and grazing capacity compared to alpine meadows (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005; Gurbanov et al., 2017).

The *Poaeta badensis-Carexetum tristis* association is represented in the *Poaeta-Carexetux* formation of alpine vegetation on the grassy mountain-meadow soils on the high slope (at an altitude of 3171 m above sea level) between Alagol and Garagol located in the summer pastures of the region.19 species of land plants (embryophyta) in the species composition of this association are found; of which 4 species (21.1%) belong to shrubs and 15 species (78.9%) belong to perennial grasses; 7 species (36.8%) are characterized by xerophytes, 2 species (10.5%) by mesoxerophytes, 9 species (47.4%) by mesophytes and 1 species (5.3%) by hydrophytes from the same amount of plants.

The dominant type of phytocenosis is *Carex tristis Bieb.* İts abundance is 3-4 points and subdominant is *Alpine Poa badensis* Haenke and abundance is 2-3 points. Due to its structure, the vegetation of the formation three-storeyed. The total project coverage varies between 60-85%.

Subalpine meadows spread on dense grassy highland-meadow-steppe soils, at the foot of "Parmachitepe" at an altitude of 2328 m above sea level, *Festuceta-Alchemilletum* formation, *Festuceta ovina - Alchemilletum sericata* association are represented in summer pastures areas that spread in the north-east of Garagol reserve in the territory of the Lachin district.

2 species (6.5%) are shrubs, 1 species (3.1%) are semi-shrubs and 28 species (90.3%) are perennial grasses according to the biomorphological analysis of 31 species of higher flowering plants registered in the species composition of the association;18 species (58.1%) belong to mesophytes, 5 species (16.1%) to mesoxerophytes, 6 species (19.3%) to xerophytes and 2 species (6.5%) to hydrophytes from the same number of species according to ecological analysis.

The abundance of *Alchemilla sericata* Reichenb. ex Bus. of the dominant phytocenosis is estimated at 4-5 points and abundance of *Festuca ovina L.* of subdominant is 2-3 points. Vegetation is three-tiered. The total project coverage varies between 60-80%.

The species of *Thymus collinus* Bieb., *Taraxacum confusum* Schischk., and *Rosa sachokiana* P.Jarosch. are endemic plants of Caucasian natural habitat which occur in the species composition of vegetation (Gurbanov et al., 2017; Yaroshenko, 1961). Therefore, it is recommended to protect these plant species by improvement measures of the summer pastures.

A number of geobotanical sources provide information on the productivity, forage quality and capacity of alpine and subalpine vegetation spread within the territory of the Lesser Caucasus of Azerbaijan (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005; Hajıyev, 2004, 2008; Hajıyev, et al., 1990).

Productivity, forage quality and capacity of alpine and subalpine vegetation located in summer pastures in the territory of Kalbajar and Lachin districts were determined.

The following are the indicators of the productivity of the *Narduseta* formation of alpine meadow vegetation on botanical grass groups spread insummer pastures in the territory of the district. The average yield of the formation is calculated according to the wet mass which is consumed as 19.2 centner/ha (*Poaceae* 8.4 centner/ha, legume grass 4.6 centner/ha, various herbs 6.2 centner/ha) and in dry mass is 9.6 centner/ha (*Poaceae* 4.2 centner/ha, legume grass 2.3 centner/ha, various herbs 3.1 centner/ha).

Here, the productivity of alpine vegetation in the Narduseta formation (921 ha) that is spread in the summer pasture, was calculated 9.6 cents / ha, forage unit 52.7 kg per 100 kg of dry grass. The weight on 1 hectare of pasture was calculated as 4.3 head of cattle and the capacity is 3960 heads, providing that 1.3 feed units are accepted as daily feed norm for small horned cattle.

Subalpine meadow plant *Festuceta* - the productivity of the formation of *Amoriaetum* is higher than that of the alpine meadow *Narduseta phytocenosis*, and also plays an important role in the forage reserves of summer pastures.

Average yield in wet mass according to the botanical grass groups of this formation is 35.1 centner/ha (grains 11.8 centner/ha, legumes 15.6 centner/ha, various herbs 7.7 centner/ha) and 35.1 centner/ha (grain grass 11.8 centner/ha, legumes 15.6 centner/ha, various herbs 7.7 centner/ha) and in dry mass it is 16.7 centner/ha (grain grass 5.6 centner/ha, legume grass centner/ha and various varieties 3.6 centner/ha).

Formation of *Festuceta* - *Amoriaetum* which occurs in the widest natural habitat of summer pastures of the region were determined as 6292 ha, productivity in dry mass as (16.7 centner/ha), feed unit as (57.9 kg in 100 kg of dry grass), grazing period in pastures as (120 days). The weight on 1 hectare of pasture was calculated as 6,4 head of cattle and the capacity is 40268 heads, providing that 1.3 feed units are accepted as daily feed norm for small horned cattle (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005).

Productivity of Poaeta-Carexetum formation on botanical grass groups was calculated in the most widespread alpine meadow in summer pastures in Lachin region (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005). In particular, the average productivity of this formation is 21.2 centner/ha (grain grass 7.1 centner/ha ha, legume grass 4.5 centner/ha, various herbs and stubbles 9.6 centner/ha) due to the wet biomass which is eaten.

Feed unit (54.8 kg in 100 kg of dry grass), grazing period in pastures 90 days) were determined in the phytocenosis of Poaeta - Carexetum (4981 ha) which spread in the widest natural habitat of summer pastures. The weight on 1 hectare of pasture was calculated as 4,5 head of cattle and the capacity is 22415 heads, providing that 1.3 feed units are accepted as daily feed norm for small horned cattle (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005).

The productivity of the subalpine meadow *Festuceta - Alchemilletum* formation that widespread in summer pastures of this region was found in botanical grass groups. The productivity of the formation is higher than that of the *Poaeta-Carexetum* formation.

Formation of *Formuceta-Alchemilletum* which is spread summer pastures in the highland areas of the region was determined as 2469 ha, yield productivity in dry mass as 17.2 centner/ha, forage unit as (62.2 kg per 100 kg of dry grass), grazing period of vegetation as 120 days. The weight on 1 hectare of pasture was calculated as 6.7 cattles and the capacity is 16542 heads, providing that 1.3 feed units are accepted as daily feed norm for small horned cattle (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005).

163510 hectares of summer pastures (93354 ha in the territory of Kalbajar district and 70156 ha in the territory of Lachin district) assigned to the administrative regions of the country are used as a natural fodder source by legal entities and individuals for the development of sheep breeding in the summer pastures of Kalbajar and Lachin districts located in the territory (In the economic-geographical region of Kalbajar-Lachin) of East Zangazur economic region.

In the territory of the Kalbajar region, 93,354 hectares of summer pastures were assigned to 17 regions (Beylagan, Agjabadi, Barda, Tartar, Samukh and other regions) (General Scheme on efficient use of natural fodder areas of the Republic of Azerbaijan until 2005, 2005). The capacity of

93,354 hectares of summer pastures in the Kalbajar region contains 4.0 cattles. The total grazing capacity of summer pastures in this region is calculated as 375,226 head of cattle.

Summer pastures in the territory of Lachin district are assigned to 8 regions (Jabrayil, Fuzuli, Agdam, Imishli and other regions). Grazing of 275156 heads (average 4 heads per hectare) small horned cattle on 70,156 hectares in the territory of this region is calculated.

Over the past 30 years, the summer pastures of both regions have been severely affected by pasture erosion and the "ecocide process". Therefore, the effective utilization and improvement of alpine and subalpine vegetation based on the previously mentioned geobotanical features to prevent soil and vegetation degradation in the summer pastures of these regions is of great economic and environmental importance. (Aghaguluyev, 2011; Hajıyev, 2004; Gurbanov et al., 2017).

The degradation of land vegetation continues as a result of the violation of the ecological balance due to the negative impact of anthropogenic and natural factors in the summer pastures of the Kalbajar and Lachin districts. For that reason, the intensification of such negative effects creates difficulties protection of fodder, medicine, endemic and species included in the "Red Book of Azerbaijan" growing there, as well as safeguard. In this regard, it is recommended to implement the following measures on a scientific and practical basis for the restoration of soil fertility and vegetation (biodiversity) in the summer pastures of the East Zangazur economic region:

- grazing of cattle with the application of pasture rotation
- surface improvement on eroded slopes, as well as the destruction of harmful and poisonous plants in some pastures;
- application of sowing and fertilization of perennial forage crops that form grass according to agronomic rules;
- effective utilization of alpine and subalpine meadows in summer pastures after vegetation restoration.

CONCLUSIONS

1. 21 species of land plants are found in the species composition of *Narduseta* formation of alpine vegetation, and 2 of them are shrubs, 1 is semi-shrub, 18 are perennial grasses; there are 8 types of mesophytes, 2 types of mesoxerophytes and 11 types of xerophytes. The species of *Poaeta - Carexetum* formation includes 19 species, including 4 species of shrubs, 15 species of perennial grasses;7 types of xerophytes, 2 types of mesoxerophytes, 9 types of mesophytes and 1 type of hydrophytes are recorded.
2. The species composition of the formation of Subalpine plant *Festuceta - Amoriaetu*m consists of 29 species. There are 4 types of shrubs, 2 species of semi-shrubs, 23 species of perennial grasses; It is characterized by 14 species of mesophytes, 4 species of mesoxerophytes, 10 species of xerophytes and 1 species of hydrophytes. There are 31 species of land plants in the species of the composition of *Festuceta-Alchemilletum* formation. 2 species are shrubs, 1 species is semi-shrub, 28 species are perennial grasses; There are 18 species of mesophytes, 5 species of mesoxerophytes, 6 species of xerophytes and 2 species of hydrophytes.
3. Studies show that the average productivity of *Narduseta* and *Poaeta-Carexetum* formations of alpine vegetation formed in summer pastures in the territory of Kalbajar and Lachin regions is defined 9.6 and 10.6 centner/ha, as well as 16.7-17.2 centner/ha for the formation of *Festuceta-Amoriaetum* and *Festuceta-Alchemilletum* of subalpine vegetation.
4. As a result of calculations, it was found that the forage unit of 100 kg of dry grass of Narduseta formation of the alpine plant is 52.7 kg, the forage unit of *Poaeta-Carexetum* formation is 54.8 kg per 100 kg of dry grass mass. There are also 57.9 kg of forage unit per 100 kg of *Festuceta - Amoriaetum* formation of the subalpine vegetation and *Festuceta-Alchemiletum* have 62.2 kg of forage unit per 100 kg of dry grass.
5. According to the pasture capacity, it was determined that it is possible to graze 4.3-4.5 head of small horned cattle in the alpine vegetation of the East Zangazur economic region, and 6.4-6.7 heads of small horned cattle in subalpine vegetation.

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Şərqi Zəngəzur iqtisadi rayonu ərazisində yay otlaqlarının alp və subalp bitkiliyinin geobotaniki xüsusiyyətləri

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Məqalədə Kəlbəcər və Laçın rayonlarının yay otlaqlarının alp və subalp bitkiliyinin geobotaniki xüsusiyyətlərinin tədqiqinin nəticələri öz əksini tapmışdır. Alp və subalp bitkiliyə aid olan otlaqların fitosenoloji xüsusiyyətləri (növ tərkibi, quruluşu və formasiyaların məhsuldarlığı) və otlaq tutumu tərəfimizdən öyrənilmişdir. Tədqiq olunan regionun yay otlaqlarının səmərəli istifadəsi yolları və yaxşılaşdırılması tədbirləri barədə tövsiyyələr verilmişdir.

Açar sözlər: *Fitosenoz, formasiya, assosiasiya, dominant, otlaq, otlaq tutumu, məhsuldarlıq, subdominant, endemik*

Геоботанические особенности альпийской и субальпийской растительности летних пастбищ Восточно-Зангезурского экономического района

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В статье излагаются результаты исследований геоботанических особенностей альпийской и субальпийской растительности летних пастбищ Кельбаджарского и Лачынского районов, которые используются для отгонного овцеводства. Нами изучены фитоценотические особенности (видовой состав, структура и урожайность формаций) и емкость пастбищ, относящихся к альпийской и субальпиской растительности. Рекомендованы мероприятия, направленные на рациональное использование и улучшение летних пастбищ данного региона.

Ключевые слова: *Фитоценоз, формация, ассоциация, доминанта, пастбище, емкость пастбища, продуктивность, субдоминанта, эндемик*